TOWARDS THE DEVELOPMENT OF A CHILD FEEDING INDEX: USING THE DEMOGRAPHIC & HEALTH SURVEYS FROM LATIN AMERICA

Marie T. Ruel and Purnima Menon

International Food Policy Research Institute (IFPRI), Washington, D.C. 20006; and
Division of Nutrition Sciences., Cornell University, Ithaca, N.Y., 14853

Background

Recent advocacy efforts from nutritionists to bring the topic of child care on the agenda of program planners and policy makers have been hampered by the difficulties related to appropriately measuring and quantifying child care. A lot of the attention maternal schooling has received in recent years, for instance, is due to the fact that one could show policy makers provocative graphs illustrating the dramatic impact that each year of additional maternal schooling could have on reducing childhood morbidity, mortality and malnutrition. Although giant steps have been made in the past decade in strengthening the conceptual evidence of the importance of child care for nutrition and health, the quantitative evidence and the elegant graphs showing how many lives could be improved and/or saved if mothers' care practices were improved are still lacking.

Our work does not pretend to fill this gap, but it constitutes one of the first attempts at measuring and quantifying child feeding practices (one of the main components of child care) using widely available survey data. The Demographic and Health Surveys (DHS) are one of the richest and most easily available sources of information currently available on child nutrition and health. The data have been used extensively worldwide and repeated surveys in the same countries have allowed trend analyses, which have been particularly useful to describe changes in the world nutrition situation. The child feeding information available in many of these surveys, however, has been typically underused. Reports from many countries show one or two tables describing child feeding practices, but they usually focus mostly on reporting prevalences of various breastfeeding patterns, and they lack a clear, simple message. They provide little clue about the quality of complementary feeding, and fail to address the key issue of whether feeding practices really matter for child nutrition and health..

Objectives

The main goal of this research was to develop a methodology to measure and quantify child feeding practices using DHS data, and to promote greater use of this rich information at the national and the international levels. The main approach consisted of first exploring the feasibility of creating a composite child feeding index, and second, to use it to examine associations between child feeding practices and nutrition.

Methods

The main challenge of creating a useful and accurate child feeding index is the need for the index to capture both the age-specific nature of feeding practices and their complexity. This means that the index has to be created separately for different age groups so that it reflects current feeding recommendations. It also has to allow the inclusion of the various dimensions of child feeding, which include breastfeeding, the timing, quality and frequency of complementary feeding, and meal frequency. Thus, the variables available in the DHS surveys that were used in this study to create the feeding index were current breastfeeding, the use of complementary foods and liquids in the past 24 hours, the frequency of their use in the past week, and feeding frequency. Other aspects of feeding that are important components of child feeding practices, i.e. active encouragement on the part of the caretaker, and appropriate responses to child hunger cues, are not available in the DHS data sets. The index was made age-specific (both in the variables included and in their coding) for 0-6, 6-9, 9-12 and 12-36 months age groups (see Tables 1 and 2 for the list of variables included in the index and their coding). Feeding terciles were derived to categorize feeding practices into poor, average and good.

Data from 5 Latin American countries (7 data sets) were used. Data were analyzed separately for each age group, and by country and data collection year. Because childhood stunting is the main nutritional problem in Latin America, height-for-age (HAZ) (as opposed to weight-for-age or weight-for-height) was used as the main nutritional outcome of all analyses. Bivariate analyses were done to describe urban/rural differences in individual child feeding practices and in feeding index scores, and to look at differences in nutritional status between the three feeding index groups (terciles). For the 12-36 months old group, multivariate analyses were conducted to verify the importance of the child feeding index as a determinant of child nutritional status, controlling for other socio-demographic determinants at the child, maternal and family level (e.g. child age, gender, maternal schooling, parity, urban/rural residence, ethnicity and socioeconomic status[1]). We also tested whether any of these characteristics interacted with the feeding index scores, which would indicate that some subgroups of children benefited more from good child feeding practices than others.

Results

Mean feeding index scores were systematically higher among rural children from 0-6 months of age. From 6 months on, however, a reversed pattern was observed whereby urban children had consistently greater feeding index scores. When looking at the individual practices, it was clear that the reason why rural children fared better during the first half of their first year of life was that they were more likely to be breastfed, and they were less likely to receive other liquids,

[1] A socioeconomic status index was derived from principal components analysis using data on housing characteristics and availability of hygiene and sanitary services.

semi-solids or solid foods during this period. After 6 months of age, although breastfeeding rates remained lower in urban areas, the greater feeding index scores of urban children were due to a greater and better use of complementary foods compared to rural children. Dietary diversity was greater among urban children (number of food items received in the past 24 hours), the frequency of use of complementary foods was greater (7-day recall), and even more importantly, the quality of complementary foods was better, as seen by the greater use of eggs, fish and poultry products and meat. Interestingly, the magnitude of the gap between urban and rural children kept increasing with age (e.g. the difference in favor of urban children was greater among 12-36 months old than among 6-9 months old children).

As well-documented in the literature, rural children were systematically more malnourished than urban children at all ages (lower mean HAZ), and their slight advantage in terms of feeding practices during the first 6 months of life did not translate into better nutritional status during this period or slightly thereafter. Again, the magnitude of the urban/rural gap in nutritional status showed a gradual increase with age, going from approximately 0.3 z-scores among the 0-6 months old to a difference twice as large (0.6 z-scores) among the 12-36 months old group.

Better child feeding practices were strongly associated with better nutritional status among 12-36 months old children in all 7 data sets in bivariate analyses (Figure 1). Differences as large as 0.6 height-for-age z-scores were found between the lowest and highest feeding terciles in Guatemala ('95) and differences close to half a z-score were found in both Peru and Nicaragua. Although similar trends were observed at younger ages, the differences were not as consistent.

The multivariate analyses confirmed that child feeding practices were associated with better nutritional status in all countries (statistically significant in 5 of the 7 data sets), even when controlling for potentially confounding socio-demographic factors. They also revealed some very interesting interactions between maternal and family characteristics and the feeding index. In Bolivia '98, the interaction with household socioeconomic status showed that good feeding practices made a much larger difference among poorer than wealthier households (Figure 2). In Guatemala '95, child feeding interacted with child's age and a greater effect of good feeding practices was observed among older children (30-36 months), compared to the younger age groups (Figure 3). Also in Guatemala, but in the more recent survey ('99), a greater effect of good feeding practices was found among Ladino children than among Indian children (Figure 4).

Conclusions

Our research shows that the child feeding information available in DHS data sets can be used effectively to create a composite child feeding index. This clearly represents an invaluable tool for advocacy purposes because it allows one to quantify and model child feeding practices and to illustrate the strength of their association with child nutrition or health outcomes.

The analysis of urban/rural differences in individual feeding practices in this study is also enlightening and constitutes only one of the multiple potential applications of this type of analysis. For example, a similar approach could be used to look at differences in child feeding practices by region, by maternal education or by socioeconomic status, and the information could feed into the design of specific nutrition education messages or interventions targeted to selected population groups or specific geographic regions within a country.

The specific findings of our analyses of Latin American data sets are powerful in demonstrating the potential of strategies to improve child feeding practices to help reduce stunting in this region. The overall 0.5 z-score advantage in height among children who received good compared to poor feeding is a considerable effect size and is comparable to the magnitude of differences usually attributed to maternal education or socioeconomic differentials. The example from Bolivia '98 shows a difference in HAZ of this size between the extreme socioeconomic terciles, and highlights the fact that in this population good care practices in households above the "average" socioeconomic status do not provide additional benefits to child nutrition. Children in the higher socioeconomic group, however, still had a relatively low mean HAZ of –1.

The nature of the urban/rural differentials in child feeding practices confirm previous assumptions and provide empirical evidence that children's diets in urban areas are better than in rural areas of Latin America (from the age of 6 months on). Although breastfeeding rates are typically lower in urban than in rural areas, the earlier introduction of complementary foods, the greater dietary diversity and the higher food frequency appear to give urban mothers a higher overall feeding score in the countries studied. Our analyses indicate that this is probably one of the mechanisms explaining the better nutritional status of children in urban areas. The fact that area of residence remains statistically significant in the models that include other determinants of child nutritional status, however, suggests that it has an independent effect above and beyond the effects of child feeding, maternal schooling and household socioeconomic status. The absence of interaction with feeding practices, on the other hand, suggests that the importance of good feeding practices is consistent across urban and rural areas.

Overall, we believe that the method used in this study to explore child feeding practices using the DHS data sets constitutes an invaluable program and policy tool. It can be used to identify both vulnerable groups and specific feeding practices to target through nutrition education and behavior change programs. Since the DHS data sets are so widely available and contain such invaluable information, it is imperative that we pursue our efforts to use them more extensively to understand the nutritional problems of developing countries and to identify potential solutions.

(This research was supported by the USAID University Partnership Program and IFPRI).

Table 1. Variables and scoring system used to create the child feeding index for infants 0-6 months old

Variable	Coding
Currently breastfeeding	No = -1; Yes = +1
Timing of breastfeeding initiation	0-0.9 h = +2 1-1.9 h = +1 3-5.9 h = 0 ≥ 6 h = -1
Uses baby bottles	No = +1 Yes = -1
In the past 24 hour gave: - Non-milk liquids	No = 0 Yes = -1
- Non-breast milk	No = 0 Yes = -1
- Other liquids, semi-liquids, solids	No = 0 Yes = -1
Maximum/minimum	**+ 4 / -6**

Table 2. Variables and scoring system used to create the child feeding index for children 6-36 months, by age group

Variables	6-9 months	9-12 months	12-36 months
Breastfeeding	No = 0; Yes = +1	No = 0; Yes = +1	No = 0; Yes = +1
Use bottle	No = 0; Yes = -1	No = 0; Yes = -1	No = 0; Yes = -1
Dietary diversity (in past 24 hours)	**Sum of:** (grains + tubers + milk + other foods): 0 = -1 1-2 = 0 3-4 = +1	**Sum of:** (grains + tubers + milk + other + eggs/fish/poultry): 0 = -1 1-3 = 0 4-5 = +1	**Sum of:** (grains + tubers + milk + other + eggs/fish/pooultry + meat): 0 = -1 1-3 = 0 4-6 = +1
Food frequency (past 7 days)	**For each of:** - **carbohydrates (grains + tubers)** - **milk** 0 times in past 7 d = -1 1-3 times in past 7 d = 0 4 times in past 7 d = +1 **Food frequency** = sum of scores for carbo + milk **1 Bonus point each,** if consumed: - meat (once or more times) - eggs/fish/poultry (once or more)	**For each of:** - **carbohydrates** - **milk** - **eggs/fish/poultry** 0 times in past 7 d = -1 1-3 times in past 7 d = 0 4 times in past 7 d = +1 **Food frequency** = sum of scores for carbo + milk + eggs/fish/poultry **1 Bonus point** if consumed: - meat (once or more times)	**For each of:** - **carbohydrates** - **milk** - **eggs/fish** - **meat** 0 times in past 7 d = -1 1-3 times in past 7 d = 0 4 times in past 7 d = +1 **Food frequency** = sum of scores for carbo + milk + eggs/fish/poultry + meat
Meal frequency **(past 24 hrs)**	0 meals/d = -1 1 meal/d= 0 2 meals/d = +1	0 meals/d = -1 1-2 meals/d = 0 3+ meals/d = +1	0—1 meal/d = -1 2-3 meals/d = 0 4+ meals/d = +1
Maximum/minimum	**+8/-5**	**+8/-6**	**+8/-7**